
Country / City USA, ITHACA (NYS)
University / School CORNELL UNIVERSITY
Academic year 2017-2018
Title of the project RADICAL MOVEMENT. Coastal technologies, sediment process and culture of barrier islands
Authors THERESA RUSWICK





PERFORMATIVE NATURE

Barcelona International Landscape Architecture Biennial

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SCHOOL PRIZE

X International Landscape Architecture Biennial

Máster d'Arquitectura del Paisatge -DUOT - UPC

ETSAB- Escola Tècnica Superior

d'Arquitectura de Barcelona

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TECHNICAL DOSSIER

Title of the project RADICAL MOVEMENT. Coastal technologies, sediment process and culture of barrier islands
Authors Theresa Ruswick
Title of the course Design Thesis
Academic year 2017-2018
Teaching Staff Brian Davis, assistant professor
Department/Section/Program of belonging
Landscape Architecture Department, College of Agriculture and Life Science
University/School Cornell University

Written statement, short description of the project in English, no more than 250 words

..... Barrier islands, comprised of dunes, lagoons, and tidal wetlands, frame the east and gulf coast of the United States. Formed and altered through wind and wave action, barrier islands are in a constant state of dynamic equilibrium. Over the past two centuries,..... these processes have been stymied in order to create a stable environment for development. As sea levels continue to rise..... throughout the next century, barrier islands rely on the currently obstructed erosion, deposition, and overwash process to regress back to the mainland and to higher ground.....

..... The discipline of landscape architecture is in a unique position to study and design a cultural landscape that allows for necessary transformation in the impending sea level rise. This thesis will be positioned on Ludlam Island, a seasonally populated, and low-lying to explore the ideas of ecological process, technologies and culture. Working across scales, the thesis will focus on the designing intentionally with sediment processes, specifically wind and overwash to facilitate island retreat.....

For further information
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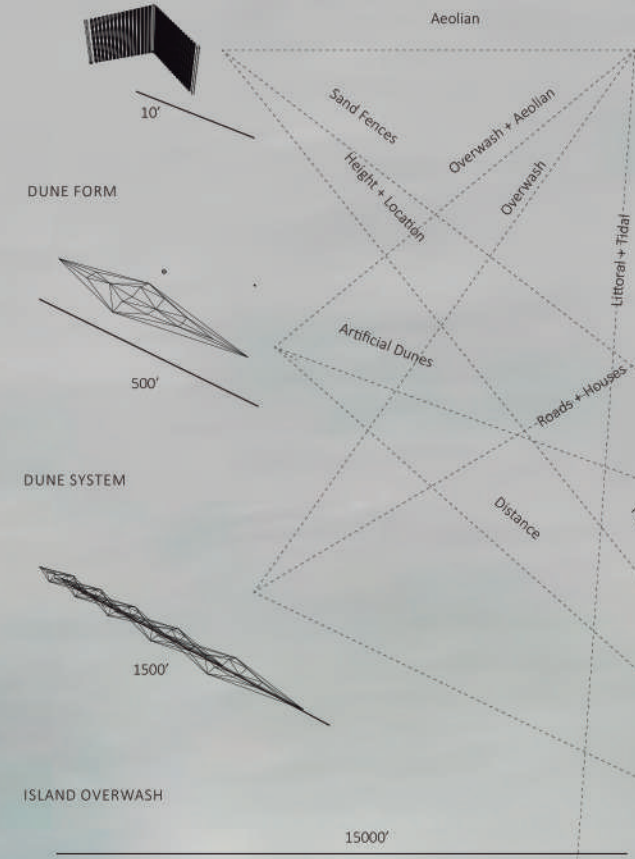
30 years 20 years 16 years 14 years 12 years 8 years

Sea Isle Movement : 6' of Vertical change + 600' Horizontal Change
Based on Bruun's Rule: 100' retreat/ 1' SLR

Tidal and overwash changes the shape of the island rapidly (transparency).
Littoral drift takes place over decades (dotted line)

THIS THESIS WILL DESIGN FOR MULTIPLE SCALES: FROM SAND FENCE TO ISLAND IN ORDER TO RE-ASSEMBLE THE IMPORTANT AGENTS; SEDIMENT PROCESSES, URBAN MORPHOLOGIES, & COASTAL TECHNOLOGIES

SAND ACCRETION + MOVEMENT



SEDIMENT PROCESSES

Use sediment process (aeolian, overwash, littoral, and tidal) to anticipate, allow, and facilitate island movement.

URBAN MORPHOLOGIES

Roads and houses structure patterns of overwash and inform the low/high points of the dunes.

COASTAL TECHNOLOGIES

Re-imagining of existing coastal technologies, in particular sand fences, and engineering dunes.

SIMPLICITY

Based on Army Corps of Engineers' details, the design will rely on simple manipulations of high/low points of dunes, spacing of dunes, and height of sand fences to create complex shapes.

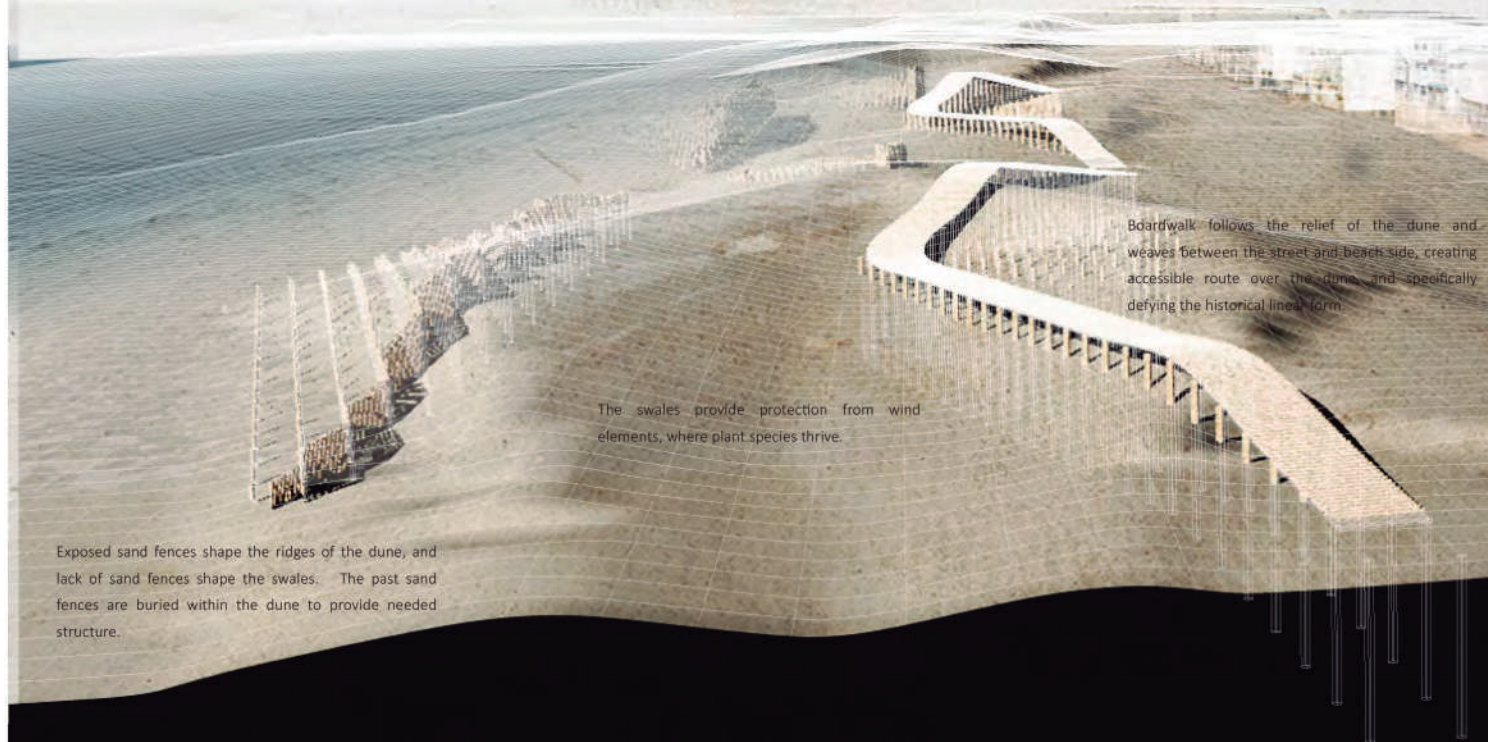
1 SAND ACCRETION + MOVEMENT THROUGH WIND

With the intent of eventually explore the movement of entire dunes, this scale of study explores the accretion and movement of sand through the design, placement, and height of sand fences. Sand fence technology, which has been used by individuals, municipalities, and Army Corps of Engineers to create and stabilize dunes, emulate American beachgrass in its ability to capture wind-displaced sediment, and further, stabilize the dune through the eventual build-up of material (i.e. American beachgrass roots, and buried sand fences).

SAND EXPERIMENT | SIMULATIONS THAT FOCUSED ON 1) MOVEMENT OF SAND AND 2) ACCRETION OF SAND THROUGH CHANGES OF SAND FENCE HEIGHTS



The designed dune will dramatically change the use and perception of the space. Instead of the current engineered dune system, which acts as a barrier against important sediment processes, this dune system will facilitate and direct the processes. The dunes are built up by wind, and displaced by overwash. By intentional direction of the processes, people will experience the dunes not as a protective barrier, but rather as integral to the movement and dispersion of sediment. The presence of certain structural elements (wind fences, boardwalk piles) will provide both structure and the trace of past dune locations.



Boardwalk follows the relief of the dune and weaves between the street and beach side, creating accessible route over the dune, and specifically defying the historical linear form.

The swales provide protection from wind elements, where plant species thrive.

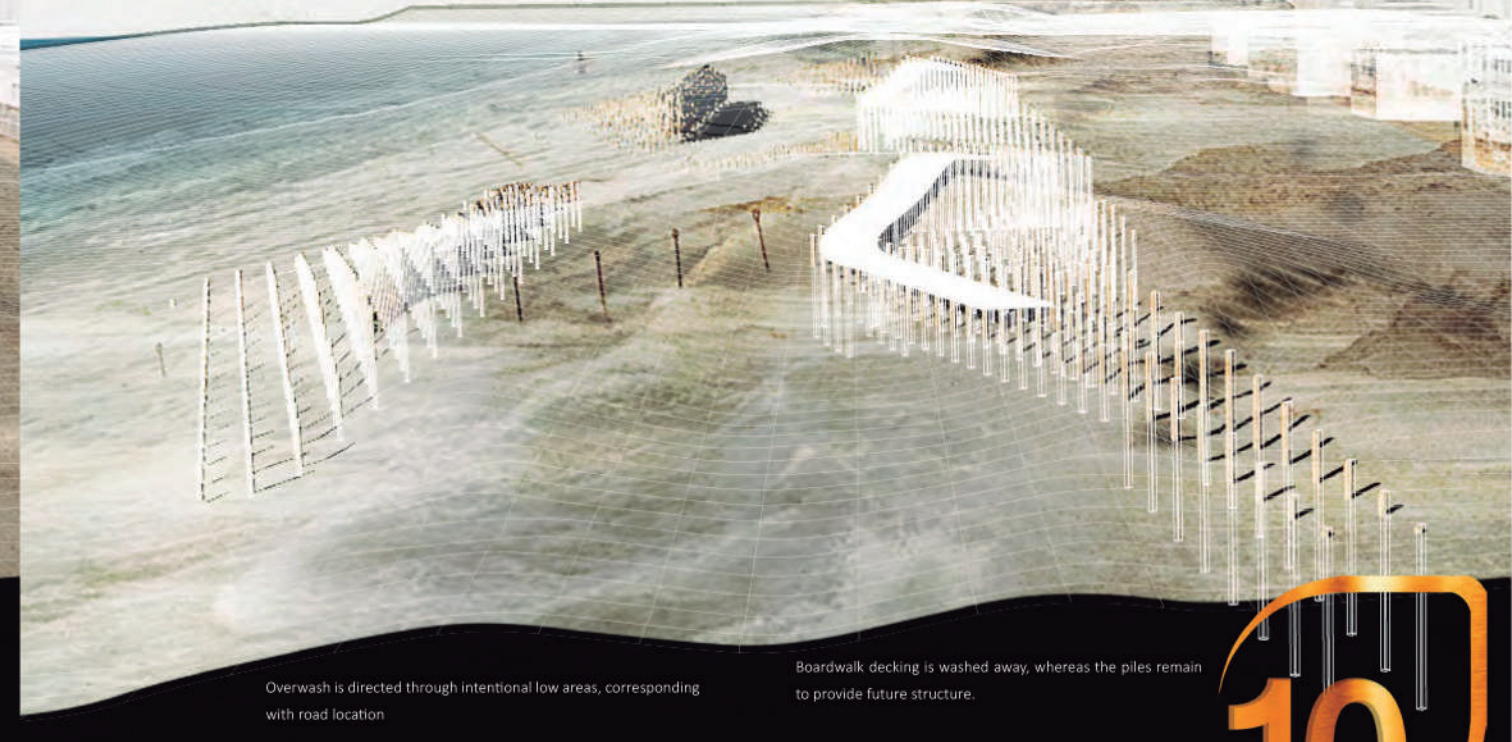
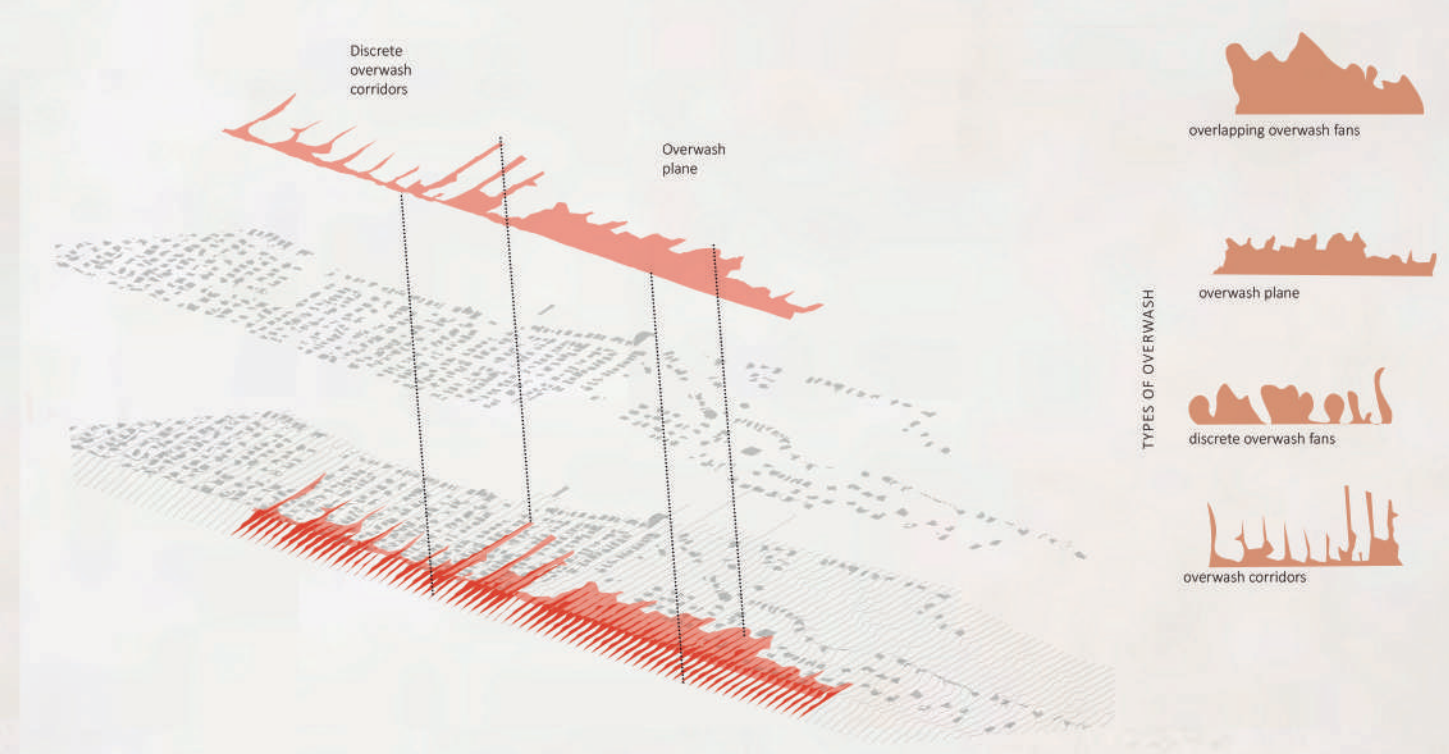
Exposed sand fences shape the ridges of the dune, and lack of sand fences shape the swales. The past sand fences are buried within the dune to provide needed structure.

INITIAL | SECTION PERSPECTIVE OF INITIAL DUNE, SAND FENCE, + BOARDWALK LAYOUT ON SITE 2

2.... THROUGH OVERWASH

Fire Island was used as precedent to study overwash in relation to urban form and topology, specifically in regards to roads and dune height. Conclusions from this study informed the treatment of Ludlam Island as a whole, and the selection of four study sites which represent familiar barrier island development topology (i.e. sparse inhabitation, inlet inhabitation, medium inhabitation, and dense inhabitation).

FIRE ISLAND STUDY | DEVELOPMENT (HOUSE+ ROAD LAYOUT) AND DUNE HEIGHT DETERMINED PATTERN OF OVERWASH



Overwash is directed through intentional low areas, corresponding with road location

Boardwalk decking is washed away, whereas the piles remain to provide future structure.

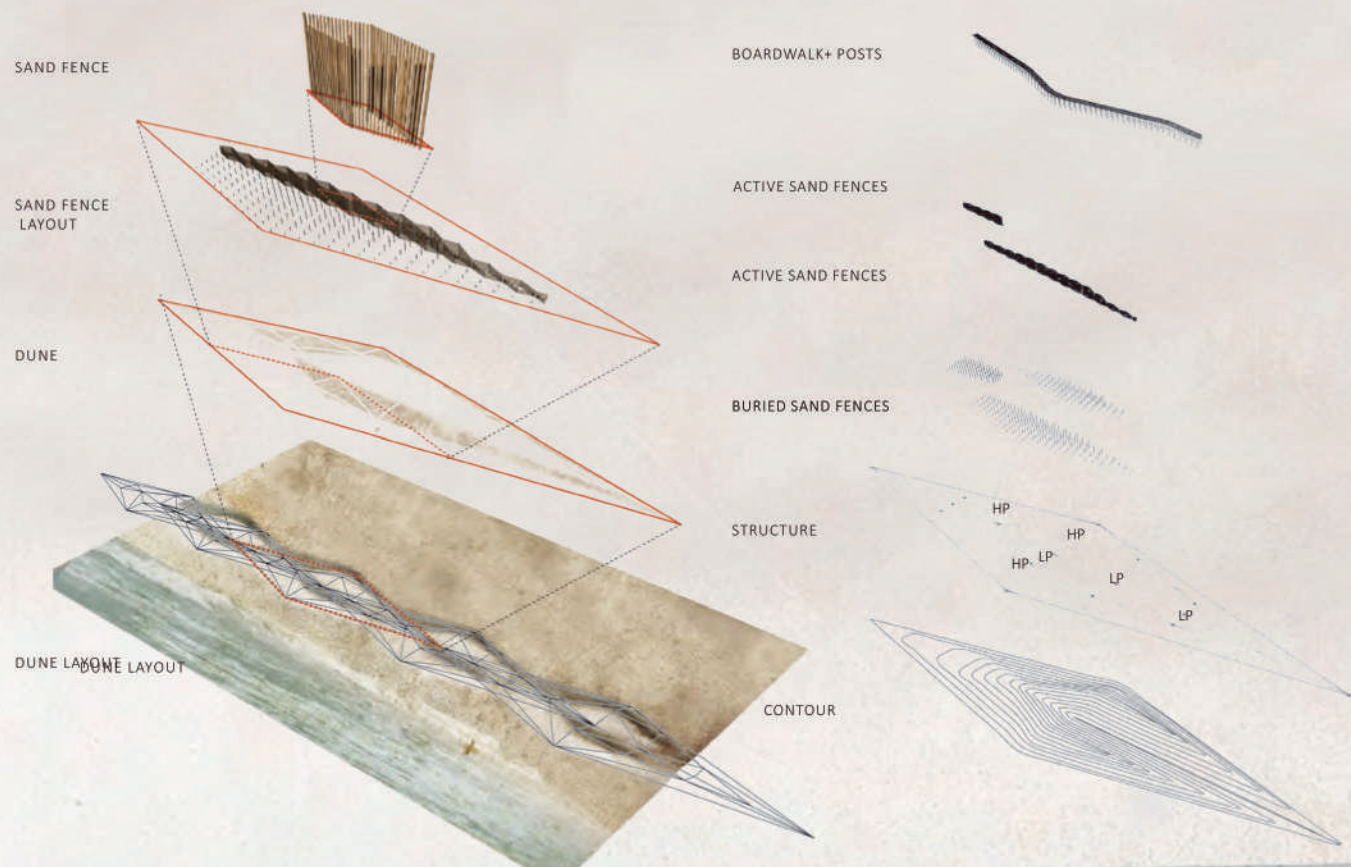
DISTURBANCE | SECTION PERSPECTIVE OF DISTURBANCE OVERWASH EVENT ON SITE 2



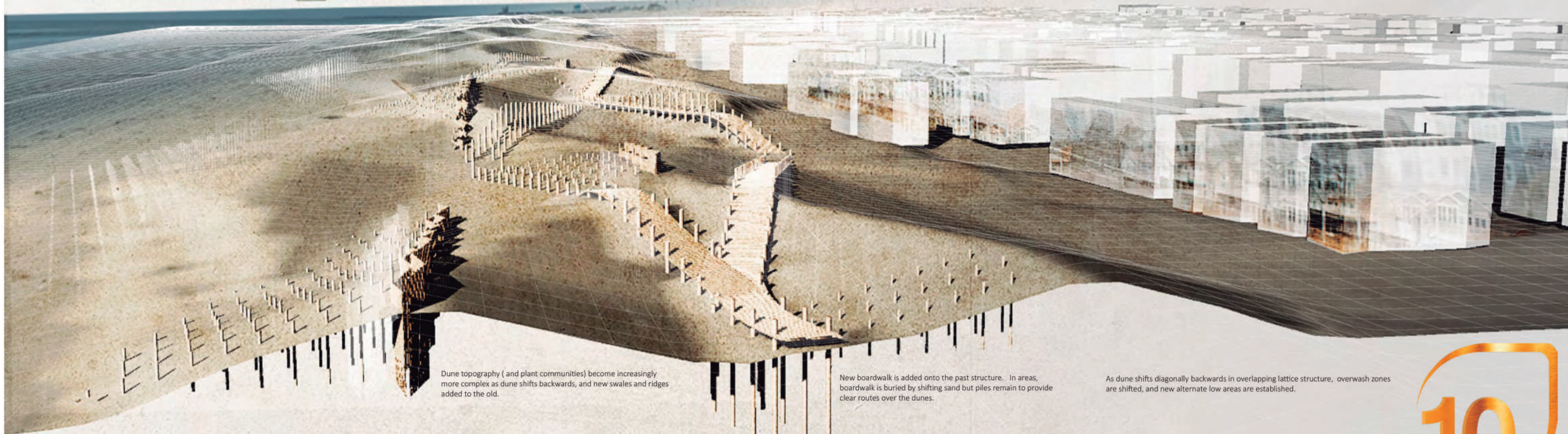
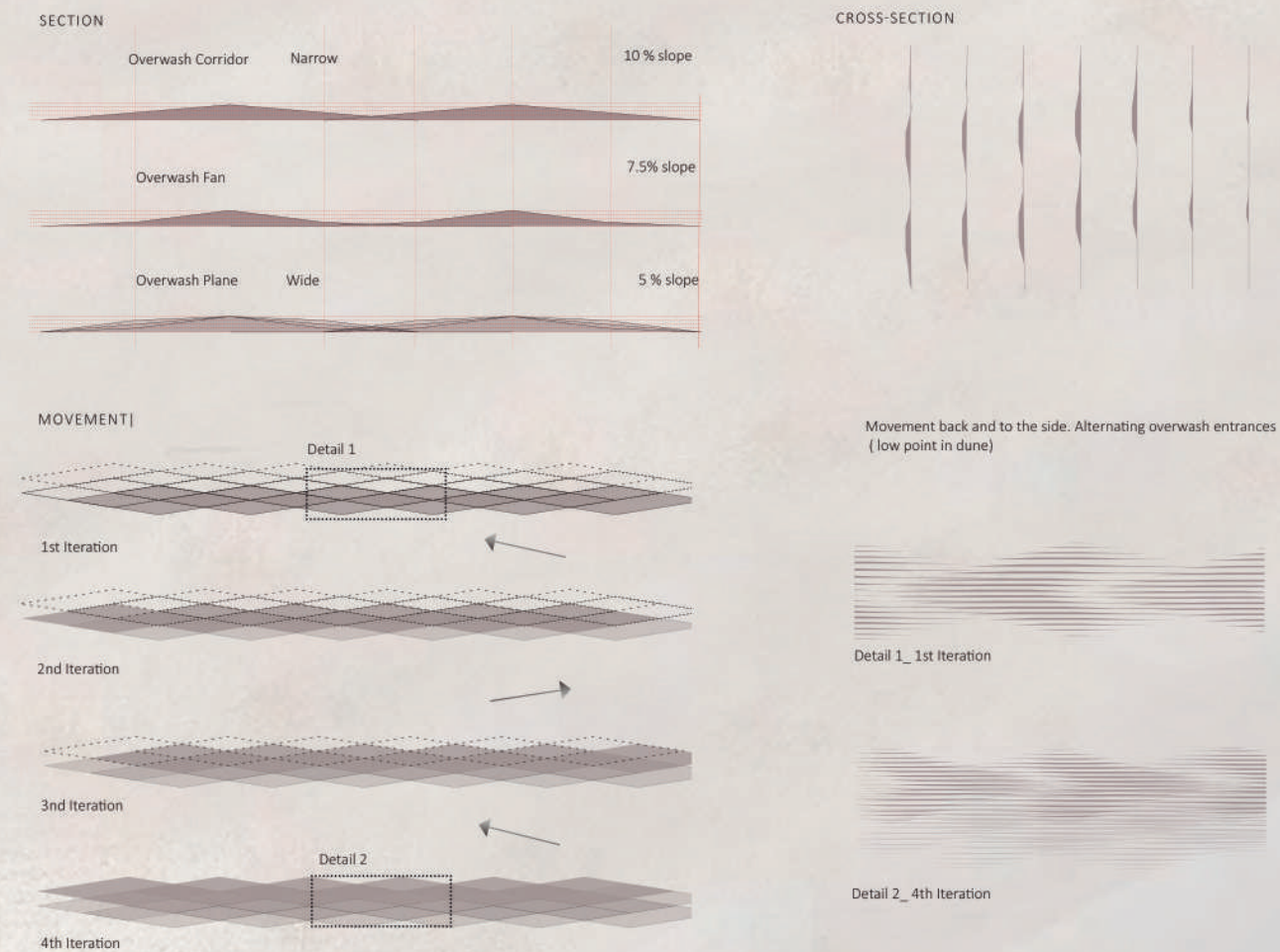
3_ DUNE MOVEMENT

Experiments with creating a dune form that: 1) Allows for various amounts of overwash as demonstration in the section view 2) Creates a variety of swales and ridges that would allow for a diverse plant community; 3) Migrates with sand fence system; 4) Is comprised of simple parts (limited high and low points set for sand fence height).

DUNE DESIGN | SIMPLE, SCALABLE + MODIFIABLE PARTS



DUNE LAYOUT | MOVEMENT OVER TIME



Dune topography (and plant communities) become increasingly more complex as dune shifts backwards, and new swales and ridges added to the old.

New boardwalk is added onto the past structure. In areas, boardwalk is buried by shifting sand but piles remain to provide clear routes over the dunes.

As dune shifts diagonally backwards in overlapping lattice structure, overwash zones are shifted, and new alternate low areas are established.

POST-DISTURBANCE | SECTION PERSPECTIVE OF REBUILT DUNE

